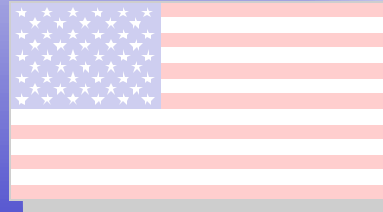


# ***Human Spaceflight Network Support Group***

***January 23-24, 2002***



*ISS's robot arm moves the Joint  
Airlock into position (STS-104)*



*STS-108 crew and Expedition  
4 pose outside Endeavor's  
hatch (STS-108)*



*Multi-Purpose Logistics Module (MPLM)  
Leonardo is moved to the payload  
canister (STS-105)*

***Regents Park III  
Johnson Space Center  
Houston, Texas***



# Network Support Group Meeting

**January 23-24, 2002  
Regents Park III  
Johnson Space Center  
Houston, Texas**

## ----- Agenda -----

Introduction	T. C. Sobchak/NASA/GSFC
DSMC Transition Plan and Status Overview	J. Sidotti/CSOC/GSFC
GSFC Mission Support Center Overview	J. Sidotti/CSOC/GSFC
HEDS Comm Working Group	M. Mascari/CSOC/GSFC
GN IP Commanding	B. Schneck/CSOC/GSFC
MILA Future Plans	G. A. Morse/SCDS/JSC
Shuttle External Tank TV	T. C. Sobchak/NASA/GSFC
Dryden Status	C. Griffith/NASA/DFRC
White Sands Space Harbor Landing Support	M. Mascari/CSOC/GSFC
E&M Keying Updates	B. Schneck/CSOC/GSFC
LION UHF Air-to-Ground Upgrades	B. Schneck/CSOC/GSFC
SSP and ISS Mission Overviews	R. Marriott/CSOC/JSC
- (SS-109, -110, -111, and -107)	
X-38 Operations Concept Status	H. Allen/NASA/JSC
NACAIT Status	J. Aquino/NASA/JSC
Orbiter Comm Upgrade	A. Chu/NASA/JSC
- Alternatives for High-rate Transport	M. Mascari/CSOC/GSFC
EMCC Procedures Update Status	J. Sidotti/CSOC/GSFC
TDRSS-H, -I, -J Status	T. C. Sobchak/NASA/GSFC
JSC User Planning System (UPS) Upgrade	M. Duffey/CSOC/JSC
- TDRSS Scheduling Policy	T. C. Sobchak/NASA/GSFC
ISS Assembly Plan	R. Marriott/CSOC/JSC
ISS/SSP Ops Splinter Summary	J. Sidotti/CSOC/GSFC
ISS Ku-band Support Status	
- ISS Antenna Pointing S/W	T. Early/NASA/JSC
FDF ISS Orbit Determination	H. Offerman/CSOC/GSFC

## -----NSG Agenda (continued)-----

ATV/HTV Compatibility Testing

J. Smith/CSOC/GSFC

Action Items

T. C. Sobchak/NASA/GSFC

## -----Splinter Meetings

Date	Meeting	Place	Time	Chair
TBD	FDF Splinter	TBD	TBD	J. Cappellari
Jan. 22, 2002	Shuttle Flight PRD Section 2760 Review	Regents Park III, 201A	8:30 am – 12 pm	C. Dry
Jan. 22, 2002	HEDS Comm Working Group	Regents Park III, 204A/204B	1 – 5 pm	M. Mascari J. Finney
Jan. 23, 2002	White Sands Space Harbor Landing/ Recorder Long-term Support Ops	Regents Park III, 201A	8:30 – 10 am	T.C. Sobchak
Jan. 23, 2002	ISS/SSP Plans/Ops and DSMC	Regents Park III, 201A	10 am – 12 pm	J. Sidotti

## NSG Attendance

Last Name	First Name	Email Address	Location	Telephone Number
Allen	Henry	henry.allen1@jsc.nasa.gov	JSC	281-483-6075
Bates	Sara	sara.bates@onizuka.af.mil	OAFS	408-752-3743
Baum	Earl	earl.baum@csconline.com	JSC	281-853-2251
Blum	Mike	michael.h.blum@msfc.nasa.gov	MSFC	256-544-5102
Bowie	Chester	chester.bowie@csconline.com	JSC	281-853-2255
Cappellari	Jim	james.o.cappellari.1@gsfc.nasa.gov	GSFC	301-805-3700
Chen	Ronald	ronald.chen@csconline.com	JSC	281-483-6943
Coppens	Jerry	gcoppens@ems.jsc.nasa.gov	JSC	281-483-3784
Douglas	Scott	Scott.c.douglas.1@gsfc.nasa.gov	GSFC	301-286-9550
DuBridge	Scott	scott.dubridge@onizuka.af.mil	OAFS	408-752-4018
Duffey	Michael	michael.duffey@csconline.com	JSC	281-483-8723
Fanders	Michael	michael.t.fanders1@jsc.nasa.gov	JSC	281-483-6069
Finney	Joe	joe.finney@csconline.com	MSFC	256-961-9443
Frazier	Robert	robert.b.frazier1@jsc.nasa.gov	JSC	281-483-4444
Gatewood	Clifton	clifton.gatewood@onizuka.af.mil	OAFS	408-752-4714
Gill	Jean	jean.m.gill1@jsc.nasa.gov	JSC	281-244-7594
Gonzales	Bob	gonzales@mail.wsc.nasa.gov	WSC	505-527-7115
Guasasco	Steve	Steve.guasasco@onizuka.af.mil	OAFS	408-752-5293
Hendrickson	Eric	Eric.Hendrickson@msfc.nasa.gov	MSFC	256-544-8735
Hodgson	Tony	Tony.Hodgson@wcom.com	JSC	832-816-1125
Huey Chamberlain	Laura	laura.huey@csconline.com	GSFC	301-805-3084
Ibanez	Frank	fibanez@ems.jsc.nasa.gov	JSC	281-244-0203
Jones	Ken	kjones1@ems.jsc.nasa.gov	JSC	281-483-7671
Lockart	Leldon	leldon.lockart@Kirtland.af.mil	Kirtland AFB	505-853-5714

## NSG Attendance

Last Name	First Name	Email Address	Location	Telephone Number
Lowes	Flora	flora.b.lowes1@jsc.nasa.gov	JSC	281-483-1954
Manning	Bill	bill.manning@csconline.com	MSFC	256-961-9491
Marion	Tim	Tim.marion@msfc.nasa.gov	MSFC	256-961-9380
Marsh	Rebecca	rebecca.e.marsh1@jsc.nasa.gov	JSC	281-483-6873
Marriott	Robert	robert.marriott@csconline.com	JSC	281-483-6879
Mascari	Michele	michele.mascari@csconline.com	GSFC	301-805-3214
Mattingly	Patricia	patricia.e.mattingly1@jsc.nasa.gov	JSC	281-483-0641
McLamb	Monique	Monique.McLamb-1@ksc.nasa.gov	KSC	321-867-8540
Miller	David	david.miller@onizuka.af.mil	OAFS	408-752-4021
Moore	Randall	randall.moore@onizuka.af.mil	OAFS	408-752-6068
Morse	Gary	gary.a.morse1@jsc.nasa.gov	JSC	281-483-3806
Navo	Mark	mark.navo@schriever.af.mil	Schriever AFB	719-200-4845
Neman	Chris	chris.neman@csconline.com	JSC	281-853-2126
Norman	Seaton	seaton.b.norman.1@gsfc.nasa.gov	GSFC	301-286-8676
Offerman	Holly	holly.offeran@gsfc.nasa.gov	GSFC	301-286-2197
Rambo Cleek	Debra	debra.rambocleek1@jsc.nasa.gov	JSC	281-244-8959
Reese	Norman	nreese@sled.gsfc.nasa.gov	GSFC	301 286-6486
Rose	Don	donald.rose@schriever.af.mil	Schriever AFB	719-567-6560
Schneck	Bruce	bruce.schneck@csconline.com	GSFC	301-805-3018
Sidotti	Joann	joann.sidotti@gsfc.nasa.gov	GSFC	301-805-3244
Simonson	David	david.simonson@patrick.af.mil	Patrick AFB	321-853-8262
Smith	Furman	fsmith@wstf.nasa.gov	WSTF	505-524-5394
Smith	John	john.smith@csconline.com	GSFC	301-805-3111
Sobchak	Ted	ted.sobchak@gsfc.nasa.gov	GSFC	301-286-7813
Testoff	Steven	steve.testoff@csconline.com	GSFC	301-805-3066

## NSG Attendance

Last Name	First Name	Email Address	Location	Telephone Number
Thompson	Traci	Traci.L.Thompson@ usahq.unitedspacealliance.com	JSC	281-282-2501
Tinsley	Theresa	teresa.j.tinsley@ usahq.unitedspacealliance.com	JSC	281-282-3754
Vermillion	Bobby	bobby.vermillion1@jsc.nasa.gov	JSC	281-483-2682
Warner	Roy	rwarner@mail.wsc.nasa.gov	WSC	505-527-7160
Watson	Lisa	lisa.watson@msfc.nasa.gov	MSFC	256-544-3523
Wegener	Richard	richard.wegener@csconline.com	JSC	281-853-3439
Wright	Kim	kim.wright@msfc.nasa.gov	MSFC	256-544-0936

## **I. Introduction**

Mr. T. Sobchak (NASA/GSFC/ND) convened the January 23-24, 2002, Network Support Group (NSG) meeting to discuss Space Shuttle Program (SSP) and International Space Station (ISS) issues relevant to the Network. The last NSG meeting was conducted in May 2001.

Following introduction of meeting attendees, material was presented as noted in paragraphs II through XXIII.

## **II. DSMC Transition Plan and Status Overview**

Ms. J. Sidotti gave an update on the status of the DSMC transition. (Refer to *DSMC Status*.)

- a. Ms. Sidotti reviewed terminology, including which terms remain valid, which terms will be changed immediately, and which terms will be gradually phased out. She also presented a graphic on DSMC functional migration.
- b. Two early transitions took place in FY 2000: 1) all Ground Network scheduling functions were transitioned from the NCC to the Wallops Scheduling Office; and 2) the NCC performance analyst (PA) and most of the technical manager (TM) functions that do not require the use of the NCCDS were migrated to WSC.
- c. GN scheduling transitions have been phased in as follows:
  - 1) GN legacy scheduling transition was completed in October 2001
  - 2) GN automated scheduling (originally planned for February 21) is being replanned because of training issues and GN launch schedules. Customers are being contacted to participate in interface tests. The transition of GN automated scheduling will be extended over the next six months. Until the final transition to WSC/DSMC, Wallops will continue to do the automated scheduling.
- d. GN STS, 9M, and Emergency/Contingency Customer transitions (in support of HSF) will take place over the next six months.
- e. During the SN transition, the NCC and WDISC systems will be relocated to the DSMC at WSC. The NCC includes following suites of equipment that will be transitioned to the DSMC: 1) the Network Control Center Data System (NCCDS); 2) the Auxiliary Network Control Center (ANCC); and 3) the NCCDS Test & Training (T&T). The NCCDS suite has been relocated to the DSMC, has undergone system testing, and is now in operations evaluation testing (OET).
- f. STS-108 and STS-109 will be shadowed by DSMC for training activities in order to fulfill the two-flight rule. Ms. Sidotti emphasized that the transition would not be

conducted within two weeks of an STS launch or landing. She also clarified for Mr. Sobchak that the SN scheduling transition was not linked to the WOTIS transition.

- g. Ms. Sidotti outlined the DSMC operations training. During STS-108, WSC schedulers received training on console at the NCC and conducted limited scheduling. Limited amounts of WDISC and ACRS-TLAS training also took place, and Ms. Merri Benjamin recently conducted database training at WSC. In response to a question by Mr. Sobchak, Ms. Sidotti explained that Ms. P. Quimby would continue to notify the Network Director of any problems until all activities have been fully transitioned to WSC. Training for HSF mission planning activities will begin on the STS-110 flight, with a proposed transition during the June-August timeframe.
- h. Regarding the DSMC Shuttle Vector Transition, Local Operating Procedures (LOP) are being expanded and brought up to date. Ms. Sidotti outlined the testing and training that has taken place thus far, noting that the training and certification plan is being worked locally at WSC. Dr. Jim Cappellari will sign off on the training. A remote workstation has been set up at WSC and is being used to conduct STS and ELV proficiency exercises. The target mission for transition of STS vector management is the first mission opportunity following the NCCDS transition to DSMC. Dr. Cappellari will travel to WSC 7-10 days in advance of the initial transition flight and conduct proficiency sims at that time. He will be in attendance at WSC during the initial transition flight and one additional flight.
- i. Ms. Sidotti reviewed operations changes. These included standard call signs for scheduling; I.P. addresses; email addresses for DSMC scheduling; contact information for DSMC scheduling personnel; WSC scheduling fax number; and operations interface procedure documentation.
- j. A GN/SN Operations Documentation Working Group was established in March 2001 to manage operations documentation across CSOC elements. The group will recommend what documentation should be archived, consolidated, or revised. The ISS TNOSP will need to be updated for terminology once the DSMC is up and running. In addition, the TNOSP for STS (which is in review) will have DSMC changes incorporated into it and will be treated as a stand-alone document.
- k. An Operations Readiness Review (ORR) will be conducted before the cutover. Personnel at WSC are receiving training in cutover procedures and recently traveled to GSFC for an ANCC cutover. During the NCCDS transition, two individuals will carry copies of the database (on two separate planes) to WSC. The group is also examining the possibility of FTPing the database to WSC, which would be done in addition to physically delivering the database to WSC. Ms. Sidotti emphasized that the transition would not impact scheduling, that the NCC would continue to run, and that only the database would be frozen during the transition. Realtime operations would not be affected, and anyone needing to put in a SHO during the transition could contact WSC. Clear guidelines will be in place outlining procedures during the cutover time, and a NAM will be issued approximately one week before the cutover. In the event that a



restoral of the database fails, the transition would stop, leaving the NCC in control. In order to alleviate risks, GN and SN transitions will not overlap.

- l. Ms. Sidotti outlined two fallback plans. The near-term fallback capacity will exist for a period of 72 hours from the cutover start time. The long-term fallback plan will exist from the termination of the near-term fallback plan until the ANCC is operational at WSGT.
- m. In Action Item NSG-01-23-01, Ms. Sidotti is to ensure that WSC is using a training plan or matrix for vector management training, and obtain a copy of the matrix from B. Hudgins.

### **III. GSFC Mission Support Center Overview**

Network functions remaining at GSFC include Network Testing and Special Operations Support (SMM/NOM) and NASA monitoring, including MOSA, remote NCCDS workstations connected to DSMC, SAMS, and WDISC workstation. The Ground Communications Center (GCC) will include the AMDS, USSPACECOM interface, and associated equipment. The NCCDS Software Sustaining will also remain for the time being, including a development suite of NCCDS equipment. Most of these functions will be house in the new Mission Support Center (MSC), with GSFC maintaining a remote capacity after the transition. Mr. John Hankinson is the MSC implementation lead. Further discussions on an MSC backup will take place. In Action Item NSG-01-23-02, Ms. Sidotti agreed to have J. Hankinson send H. Allen a copy of the presentation on the MOSA hardware replacement

### **IV. HEDS Comm Working Group**

Ms. M. Mascari (CSOC/GSFC) summarized the HEDS Comm Working Group Splinter meeting, which she co-chaired with Mr. Joe Finney (CSOC/MSFC). (See *NSG January 2002 – HEDS Comm Working Group Splinter Agenda*.) The splinter generated 10 action items, one of which has been closed. Actions will be tracked and closed during the HEDS Comm Working Group weekly telecoms. Issues addressed during the splinter included: NSAP 24 kbps voice compression; White Sands Space Harbor; Shuttle IP Commanding; Open IOnet Backbone; Mission Network Modernization; ISS Video Status; JSC-MSFC Custom Voice for ISS Payloads; ISS Command Interface (MSFC-JSC); ETE Process for Circuit Turnover; and ISS Data Flows (IPNOC). Phase 1 of ISS video will be in service on February 1, 2002. Still to be done is a card replacement at MSFC.

It was decided that HEDS Comm Working Group splinters will be held during all NSGs. In addition, a discussion took place as to whether the splinter should be expanded to a full day in order to replace the ICC Working Group.

### **V. GN IP Commanding**

Mr. B. Schneck (CSOC/GSFC) presented on the GN IP Command Status. (Refer to *GN IP Command Status*.)

- a. STS GN command requirements call for two simultaneously, diversely routed command lines from JSC to MILA for launch support. Because the current IP infrastructure does not easily allow for this, GSFC NISN is investigating options and will provide a recommendation on how to meet this requirement.
- b. The GN (MIL/DFRC and WLPS) Command Data remains on Legacy because of IP PTP buffering incompatibilities with the NCPS command system. Mr. T. Sobchak stated that in the short term, it is operationally acceptable to have one command route on IP and the other on Legacy, although IP diversity will eventually be needed. He emphasized the importance of proceeding cautiously.
- c. NISN engineering is to verify in writing that the triangle is diversely routed. In action item NSG-01-23-03, Mr. Schneck is to assemble a group (including GSFC, NISN, SMMs, NOMs, MIL, and JSC GC) to work out a schedule for IP Command testing and transition. In addition, Mr. Scott Douglas (NASA/GSFC) is provide a formal response to IP Command diversity for MIL launch support (NSG-01-23-04).

## **VI. MILA Future Plans**

- a. Mr. G. Morse presented on the MILA future plans. (Refer to *Merritt Island Launch Area [MILA] and Ponce De Leon [PDL] Commercialization Effort*.) He stated that the commercialization vision of the Space Communications and Data Systems Office (SCDS) is to acquire space communications goods and services from the private sector to the maximum extent practical. SCDS defines commercialization as purchases by NASA of goods and services from an industry that owns its own assets used in production and performance and that has customers in addition to NASA.
- b. According to the commercialization plan, Wide Area Network (WAN) and Ground Network (GN) services would be purchased from commercial service providers, while capacity on Space Network (SN) and other assets would be sold as appropriate. In addition, Lockheed Martin/CSOC would sell available capacity to commercial firms, including ELV customers.
- c. Currently, both sites are government owned; MILA is located on KSC property, and PDL is on US Coast Guard property. They provide communications with the space shuttle, other NASA spacecraft, and non-NASA spacecraft launched from the Eastern Range; perform testing and checkout of spacecraft communications links during pre-launch processing; communicate continuously with the space shuttle during critical liftoff and launch ascent periods; and provide orbital and shuttle landing support.
- d. Concerning the MIL/PDL options, CSOC initiated a “buy procurement” in April 2001 while a parallel “make” proposal was worked by Lockheed Martin. However, on October 24, 2001, CSOC advised NASA that neither the “buy” nor the “make” proposals was feasible. In response, the NASA/HQ/M3 Office of Space Communications

requested that a NASA team develop options for consideration. The following MIL/PDL options have been identified:

1. Refurbishment of critical MIL 9M system components.
  2. Further reduction of MIL infrastructure and current staffing level.
  3. Establish/renew the interface with US Air Force 45<sup>th</sup> Space Wing for TEL-4 operations.
  4. Have CSOC modify existing solicitation package to a “Cost Plus” with initial development investment from bidders.
  5. Have NASA or CSOC pursue a new site location that meets existing or modified support requirements.
- e. Mr. Morse outlined the following programmatic considerations. First, does the program see MILA’s role as including STS only, or does MILA have potential for commercialization and/or USAF/TEL-4 tracking responsibilities as well? Second, should MIL/PDL be added to the Space Shuttle Program privatization effort? Or, finally, should Enterprise responsibility be transferred to Code M?
- f. GSFC (Phil Liebrecht) has the lead to resurrect meetings on this issue.

## **VII. Shuttle External Tank TV**

- a. Mr. T. Sobchak presented on External Tank TV. (Refer to *External Tank TV Update*.) Driven by former NASA Administrator Dan Goldin, this effort is to provide realtime video of acceptable quality from an external tank during an STS launch. (Transmission will stop after 15 minutes because of spectrum issues.) This requirement is currently manifested on STS-112 but may include subsequent flights. A Statement of Requirement has been agreed upon.
- b. JSC PAO will contract for two commercial vans at WPS and satellite time for the PDL and WPS TV relay. Otherwise, all equipment is on site at MIL, PDL, and WPS. Engineering Change documentation is complete, and site installations and on-site checkout will be completed by the end of February. Funding issues between the program and JSC PAO remain to be resolved. Houston TV will not be involved.

## **VIII. Dryden Status**

- a. Mr. C. Griffith presented on the status of WATR systems. (Refer to *Status of WATR Systems: C-band, S-band, UHF/VHF*.) He noted that the Range Control Officer (RCO) at DFRC for ISS/SSP has been recalled to active duty for 4-6 months; Mr. Don Borchers will serve as her replacement.
- b. Concerning C-band, lock-up problems with the Data Enhancement System (DES) were resolved in July 2001 by moving portions of the low-speed data to the radar computer. Extensive testing has taken place over the last six months, with no anomalies observed. The prototype of the new Tracking space Positioning Information (TSPI) was in the

development lab as of December 2001, with Phase 1 of implementation scheduled for July 2002. Designed to handle multiple targets, TSPI will directly take in acquisition data. C-band upgrades over the last six months include FDRC (R38) Transmitter “Corner Cutter,” which was installed in October. The system was back online within 30 days and has been used extensively over the last three months with no anomalies. In addition, radar switch hardware and software upgrades (including an upgrade to 16 x 48 and a user-friendly GUI) were completed in December.

- c. Regarding S-band, the TRIPLEX Direct Signal Injection (DSI) installation was completed in June. The Multiple Frequency Tracking System (MFTS) DSO installation is currently in progress and expected to be completed by February. Concerning the bit sync upgrade to the Shuttle Data Processing System, Avtecs have been installed and will require PSS/on-orbit testing. Mr. Sobchak stated that there is no longer a need to operate with ranging on. The Aydin replacement is TBD, pending PSS/on-orbit testing.
- d. No new changes to either UHF or VHF were implemented. The Automatic Best Receive Source Selection System will be implemented on UHF as workload permits.
- e. No new changes were made to the ISS Comm System. Future upgrades include a high efficiency duplexor on VHF1 backup; a high power amplifier on VHF2 backup; and automated loading of NORAD TLEs.

## **IX. White Sands Space Harbor Landing Support**

- a. Ms. M. Mascari presented on White Sands Space Harbor (WSSH) Landing Support. (Refer to *WSSH NISN Implementation Options for KSC Deservice Pad Processing*.) KSC has agreed not to exceed 17 voice loops required at any time, and there will be no agreement for more than 17 lines. She outlined the requirements as follows:
  - 384 kbps channel for PC-GOAL interface (KSC to WSSH) (Using the IONet triangle)
  - 128 kbps channel for orbiter hardline data (WSSH to KSC)
  - 17 voice circuits
- b. Ms. Mascari focused her discussion on the recommended Option 1 for meeting these requirements, which calls for a carrier-provided mux. (Option 1A uses a NISN-provided mux.) Option 1 takes advantage of the existing long-run IONet closed infrastructure between KSC and WSGT and uses IONet troubleshooting capabilities as well as the IPNOCs. PC-GOAL data is IP multicast, and integrates easily into the IP Transition multicast network. With Option 1, the NISN Comm Manager would serve as the prime contact for troubleshooting and recording.
- c. The NISN ROM indicates that Option 1 would incur approximately \$95k in nonrecurring charges and \$3.5k a month in recurring costs. Funding issues are still being worked out. A NISN Service Request (NSR) has been submitted for a cost estimate.

- d. Although a detailed schedule will not be developed until after the implementation NSR is assigned, the current estimate for time to completion is approximately 120 days after notification. Security checklists are required for both KSC and WSSH interfaced to the Closed IOnet.
- e. In Action Item NSG-01-23-05, Mr. E. Hendrickson was tasked with providing an update on the landing-plus-six-hours payload requirement relative to KSC, Edwards, or WSSH landing.

## **X. E&M Keying Updates**

Mr. B. Schneck provided status on E&M Keying. (Refer to *UHF Air-to-Ground E&M Keying Status*.) JSC is using E&M Keying, which does not pass Quindar tones. Because the GSFC Voice Switching System (VSS) is not capable of passing E&M Keying, a conversion device was developed to convert E&M to Quindar and installed between the NASCAM 2000 system and the GSFC VDS. Long duration testing has exposed E-lead transitions, which are a direct result of hits on the Extended Super Frame and cause the UHF Air-to-Ground transmitters to false key. Occurring approximately 40 times per month, false keys change the transmitter state. They are not likely to be noted during short durations and are therefore more likely to be observed during launches rather than landings. Any NISN circuit connected to the Super Frame could experience these Extended Super Frame hits that cause false E&M keying.

Mr. Schneck outlined three options in resolving this issue. The first option is to move the conversion box to JSC in front of the Super Frame, which would eliminate the NISN circuit performance that is causing the false keying. This is the preferred option if money for the move is available. A second option is to leave the conversion box at GSFC and live with the false keying. The third option is recommended by CSOC and is the preferred action if money is not available to move the conversion box to JSC. It involves leaving the conversion box at GSFC and using delay/relay options, which will eliminate 99 percent of the E-lead transitions from the conversion device. In addition, 150 msec could be added to CAPCOMS tone to eliminate clipping.

In Action Item NSG-01-23-08, Mr. Schneck agreed to coordinate a test plan with KSC CD&SC for E & M to determine if it is experiencing E-lead transitions.

## **XI. LION UHF Air-to-Ground Upgrades**

Mr. B. Schneck provided status on the LION UHF Air-to-Ground Upgrades. (Refer to *Oakhanger Air-to-Ground Remote Control*.) The objective of this effort is to provide SSP with reliable Oakhanger UHF Air-to-Ground (A/G) communications at the most cost-effective price. This is to be accomplished by replacing full-time voice circuits with dial-up circuits; providing Oakhanger A/G personnel with a conference circuit; establishing all circuits and control from the MILA Comm Tech console; and installing remote capabilities at Oakhanger that would enable

all equipment to be controlled from MILA. This type of effort had previously been successfully accomplished with Bermuda. Whether or not it is a requirement is still to be determined.

Proposed changes must be coordinated with Onizuka. Implementation is expected to take four months and must be coordinated and MILA CTC installation. It is not expected to impact STS mission support.

## **XII. SSP and ISS Mission Overviews and ISS Assembly Plan**

Mr. Robert Marriott presented an SSP and ISS Mission Overview. (See *STS-109 through STS-117/ISS 8A through ISS 13A*.) He provided launch dates and general information on STS-109 through STS-111, STS-107, and STS-112 through STS-117; and ISS 8A through ISS 13A. In Action Item NSG-01-23-10, F. Pifer and R. Grossman are to work with J. McKinney to get an update on STS orbiter high definition TV operations.

## **XIII. X-38 Operations Concept Status**

Mr. Henry Allen presented on the X-38 Operations Concept. (Refer to *OPS Concept for V-201 Flight on STS-XXX*.) An X-38 V-131R upgrade is in progress to integrate upgrades and to make the V-131R system as close to V-201 systems as possible. It is scheduled for completion by June 19, 2002. A V-131R captive carry flight to test hardware and software is scheduled for August 1, 2002, and free flight #4 is scheduled for August 15, 2002. Mr. Allen also outlined the V-201 scheduled and gave an overview of the STS-XXX flight (which is yet to be manifested). He outlined STS-XXX V-201 major events; network support; TDRSS support; ground support; and V-201 link configuration.

## **XIV. NACAIT Status**

Mr. J. Aquino provided a NACAIT status. (Refer to *NACAIT Status*). The discussion covered several items:

- a. The transition to Global 1 for the Russian Space Agency (RSA) circuits is not going well. In fact, meetings are scheduled to re-evaluate the Global 1 vs. MCI implementation.
- b. Canadian Space Agency (CSA) bandwidth increases are under discussion. Funding issues may arise. The program has stated that it will not fund any more International Partner (IP) circuits. CSA wants to do remote commanding and this will exceed the current bandwidth. NASA wants CSA to explore using Gateway implementations.
- c. There was a CSA-GSFC carrier switch. No one was informed of the switch. The switch was made at the sub-contract level. Mr. B. Manning and Ms. M. Mascari are working this issue. Meetings with the sub-contract outsource are planned.

- d. There are possible Maintenance and Operations (M&O) funding issues with the Italians (ASI). The statement was made that the M&O personnel have been transitioned to CSOC and there is no funding issue with CSOC.
- e. There have been Very High Frequency (VHF) requirements changes and these are being documented. Mr. B. Marriott stated that 'successful' proficiency passes should be an element of the requirements. Mr. Aquino stated that the requirements could be written to include the proficiency passes.
- f. There was a question of funding should a project allow another project use its comm. Lines during periods on non-activity. If the owing project grants permission, there is no funding issue. If the bandwidth to be borrowed does not exist, then the borrowing project will have to provide funding.
- g. Mr. Aquino stated that the PSLAs are being reviewed. ATV and HTV will be incorporated into the ISS PSLA. There will be yearly cost reviews. The cost of future requirements may be passed to the programs (e.g., the cost of tail circuits).
- h. ISS video will be operational February 1. Testing of the second channel will begin after that date. The testing will determine the bandwidth and coding schemes for future channels.

## **XV. Orbiter Comm Upgrade**

### ***Shuttle Ku-band CTS Upgrade***

- a. Mr. Bob Vermillion presented a status on the Orbiter Comm Upgrade. (Refer to *Shuttle Ku-band CTS Upgrade*.) He reviewed the objectives of the upgrade and explained that it would provide all of the functionality currently available from the Legacy Ku-band System during the on-orbit phase, except for transmission of analog signals to TDRSS and radar active tracking mode. Analog signals, such as the Legacy CCTV, will be digitized by the CTS and multiplexed with the other data to be transmitted to TDRSS. The upgrade will provide two-way communications through the TDRSS as well as Target Search, Acquisition, and Tracking capability during rendezvous and proximity operations.
- b. Concerning Ku-band forward link, the Legacy Ku-band forward link 216 kbps data format will not be impacted by the CTS upgrade. The seldom used Ku-band forward link low data rate mode (72 kbps) will eventually be eliminated. The Receiver Center Frequency is 13.775 GHz, and polarization is RHCP. The RF carrier center frequency of the Ku-band return link is 15.0034 GHz, and polarization is RHCP. The initial return link maximum data rate will be 50 Mbps.
- c. Currently, the USA RFP release is scheduled for May 2002. Vendor selection is to take place in September 2003, and PDR will begin in early 2004. After a three-year systems design, the upgrade is expected to support its first flight in 2007.

- d. Presently, CTS system requirements are being developed, which involves identifying the best data rates to implement in terms of cost and implementation. The following input is needed from the group:
  1. What is Domsat cost to send 50 Mbps and 54 Mbps data from WSC to JSC?
  2. What is the highest data rate that WSC can send to JSC in the future if CTS does not provide a requirement.

### ***High Rate Data Transport Alternatives***

Ms. M. Mascari provided an update on High Rate Data Transport. (Refer to *High Rate Data Transport Alternatives*.)

- a. Ms. Mascari began with a description of high-rate data and its users. After reviewing transport alternatives, she outlined two options: Custom Solution (Terrestrial Option 1) and Mission Network Modernization (Terrestrial Option 2).
- b. High-rate satellite services with General Electric are under contract for approximately two years, and MNM is scheduled to be in place in approximately two years. The recommendation is to go with Option 2 after MNM is implemented. High-rate interface will be incorporated in specifications for the NISN Integrated Access Device. When this is written up, it will include data rates up to 150 Mbps; differential ECL serial clock and data; and clock changes on the fly. Ms. Mascari stated that 150 Mbps of user data space will also be requested from the vendor.
- c. In Action Item NSG-01-23-13, M. Mascari and B. Gioannini are to determine if it makes sense to replace the current WSC differential ECL with something more commercially viable.

## **XVI. EMCC Procedures Update Status**

Ms. J. Sidotti provided an Emergency Mission Control Center (EMCC) update (no presentation was used). A review copy of the EMCC document will be ready by mid-February. The document will contain DSMC input. By DSMC transition, the EMCC document should be published. No face-to-face page-by-page review is scheduled. Mr. R. Marriott stated that JSC has no input at this time and is awaiting publication of the next review copy, containing the DSMC input, to comment. Ms. Sidotti stated that she will review the EMCC PRD requirements.

## **XVII. TDRSS-H, -I, -J Status**

Mr. T. Sobchak provided a status of the TDRS H, I, and J spacecraft. (Refer to *Network Support Group DTRS H, I, J Status*.) NASA accepted the TDRS-H spacecraft in August. TDRS-8 was drifted to 171 degrees West to be co-located with F-7. NASA will use and validate the Boeing



co-location plan while slot-sharing the two spacecraft. A date has not been set for activate TDRS-8 and store F-7. Transition to TDRS-8 will coordinated with the SN user community. TDRS-I is scheduled to launch no earlier than March 2002. There are some Low Noise Amplifier (LNA) issues being worked with Boeing.

### **XVIII. JSC User Planning System Upgrade**

Mr. M. Duffey provided a JSC User Planning System (UPS) upgrade status. (Refer to *User Planning [UPS] Software Upgrade*.)

- a. Release 13 will aide the user community and Network Control Center (NCC) Forecast Schedulers by incorporating flexibility into the application software. The users will be able to provide more information in the request, allowing the NCC to better assist each customer. JSCs upgrade to Release 13 is needed for future operations. The upgrade project time line is very tight and work window extensions are being requested. The software has been loaded and did boot and is ready for testing. There is no target mission at this time. Ms. J. Sidotti stated that testing may have to wait until the ANCC transitions to WSC. Mr. T. Sobchak stated that he does not want ongoing mission operations to be dependent on DSMC transition activity. Ms. J. Sidotti and Mr. M. Duffey were assigned an action item to coordinate a time to do Release 13/ANCC testing prior to shipping the ANCC to WSC (action item NSG-01-23-17). Mr. R. Marriott stated that Release 13 will provide help the ops planners immensely and needs to be deployed as soon as practical. He further stated that he would provide any assistance that he could to facilitate its testing and deployment. Mr. Duffey reviewed the test and real-time operations plan.
- b. Mr. T. Sobchak discussed TDRSS Scheduling Policy Updates (refer to *TDRSS Scheduling Policy Updates*). There have been no changes to the TDRSS scheduling policy since the last discussions. Mr. Sobchak stated that the program still desires the larger amount of user support scheduled on the western spacecraft. Due to resource allocations, Space Shuttle and ISS should continue to perform early handovers from west to east spacecraft. The TDRSS Zone of Exclusion (ZOE) TDZ is available for Space Shuttle (with constraints) and ISS S-band support. Mr. Sobchak praised the JSC scheduling efforts in scheduling TDZ and TDRSS Unused Time (TUT). The open scheduling option has been exercised and is working well. User Planning System (UPS) Release 13 will provide even greater scheduling flexibility. Mr. B. Schneck was assigned an action item to talk to Mr. H. Michelsen regarding open TDRS scheduling (action item NSG-01-23-15). Virtual spacecraft scheduling provides the capability of TDRSS support to Space Shuttle and ISS when Single Access (SA) resources may be limited due to multiple users. Mr. M. Marsh stated that because the Space Shuttle schedule is not finalized pre-mission, it is difficult to use the virtual spacecraft scheduling option. Once the time line is known, it is very difficult to use the option in real time. The Ground Controllers (GC) do not always have insight into the blockages. The Ops Planners have this knowledge and don't understand the operational capabilities and constraints of virtual spacecraft scheduling. Mr. R. Marriott suggested that training/orientation be scheduled for the FDs, Ops Planners, and others. Mr. T. Sobchak accepted an action item to coordinate a virtual spacecraft

orientation session for FAO, Ops Planners, and pointing personnel (Note: coordinate with Milt, Bob, and Wayne) (action item NSG-01-23-16).

## **XIX. ISS/SSP Ops Splinter Summary**

Ms. J. Sidotti provided an ISS/SSP recap (no presentation was used). Ms. Sidotti stated that two topics were discussed at the splinter: 1) formalizing the critical period negotiation/notification process and 2) SGLT change forecast awareness by JSC personnel. Although the critical period process has improved since this time last year, there have been recent problems. A distribution process was initiated at GSFC to get data to those who need it. The process will continue to be worked. In addition to the long-term schedules that JSC receives, F. Pifer develops a SGLT change schedule. It is possible to provide this information via the ND's webpage. Mr. R. Marriott asked that other GSFC schedules be posted to the web site as well. Ms. Sidotti, Ms. Culley, and Mr. J. Smith were assigned an action item to coordinate posting forecasts and SGLT TDRS schedules on the ND web site (action item NSG-01-23-14).

## **XX. ISS Ku-band Support Status**

Mr. T. Early provided a Ku-band Status presentation. (Refer to *Changes to ISS Ku-band Command & Control Software*.)

- a. The ISS Ku-band subsystem was activated on the 5A.1 mission. There were a few problems with the subsystem. There was difficulty acquiring autotrack and a failure to reliability drop lock when encountering physical blockage. Command and Control (CCS) software changes were made to correct the problems. Ku-band is currently being operated in the 'Open Loop' as the default pointing mode. A Flight Rule was developed to allow constrained use of autotrack when Open Loop is not available. The Flight Rule can be deleted when software changes are made to address the Multiplexer/Demultiplexer (MDM) failover and loss of 1533 comm.
- b. Mr. Early reviewed the circumstances that generated a C&W alarm. Masks are implemented to prevent the antenna from radiating in certain zones. On GMT 96, a C&W alarm was generated that the SGANT, in autotrack mode, had radiated inside the mask that protects the Service Module (SM) from Ku-band radiation. Three scenarios have been identified for which this can occur. CCS changes have been developed that will prevent these scenarios from occurring again.
- c. Mr. Early explained that there was a firmware problem associated with Signal Drop Detection. The firmware will not be changed, but a software fix is being worked.
- d. Mr. Early described some other problems including primary to backup MDM transition and masks not working is loss of 1553 comm between MDM and SGTRC occurs.
- e. The Avionics Software Control Board has approved changes to the CCS to address the radiating in the mask problems.

## **XXI. FDF ISS Orbit Determination**

Ms. H. Offerman discussed GSFC Flight Dynamics Facility (FDF) ISS orbit determination. (Refer to *FDF ISS Orbit Determination*.)

- a. Ms. Offerman provided some background. FDF uses ISS TDRS one-way Doppler tracking data to determine the ISS local oscillator frequency. FDF analysts determined that the ISS oscillator was stable enough to use for accurate ISS orbit determination. During the August 2000 NSG meeting, FDF analysts proposed to the ISS TOPOs that the FDF orbit solutions be used for ISS SN acquisition data generation.
- b. FDF analysts worked with the TOPOs to test and verify this proposal. Verification testing was conducted in September 2001. The test results were as expected, the data could be used, and the results were presented to the Flight Directors (FD), Mr. Sobchak, and management.
- c. SN acquisition data update procedures were worked and agreed to with the TOPOs and FDF personnel. The FDF and TOPOs are ready to implement the new procedures.
- d. Mr. G. Morse asked if there was a requirement documenting this. Ms. Offerman stated that there is local oscillator determination requirement but not a requirement documenting FDF ISS orbit determination. Ms. Offerman stated that the process has been signed off and the new procedure will begin in mid-February.
- e. Mr. Morse asked if it was clearly understood that this was not an additional cost item. Mr. T. Sobchak stated that the activity is being performed as part of the FDF's current functions and is covered by the PSLA. There is no additional cost to implementing the procedure.

## **XXII. ATV/HTV Compatibility Testing**

Mr. J. Smith update the group on the status of ATV/HTV Compatibility Testing (refer to *Automated Transfer Vehicle [ATV] & H-II Transfer Vehicle [HTV] Compatibility Test Overview*).

- a. Mr. Smith began with an overview of ATV and HTV, noting that ATV/HTV Requirements are documented in the Network Program Requirements Document (NPRD). GSFC ATV and HTV activities are conducted under NACAIT auspices in close cooperation with JSC and international customers.
- b. Category 1 ATV/TDRSS RF compatibility testing took place at GSFC January 7-17. Despite a delayed start, testing was completed ahead of schedule. Preliminary results are positive for the engineering checkout, the RF compatibility test, and the RF compatibility test via TDRS. In addition, actual commands and telemetry were

successfully sent through TDRS using a simulator. Mr. Smith noted that the ESA/NASA team should be commended for its outstanding effort, attitude, and ability to create a success-oriented work environment. Because Category 1 testing went so well, Category 2 testing may be reduced.

- c. The ATV/TDRSS Compatibility Test Plan for Category 1 testing was signed in late December by ESA and NASA, with a disclaimer in place for Category 2 plans. The plan was redlined in real-time during testing, and the test-results report will document actual configurations, performance, and issues. A quick-look was released on January 23, with the final report expected to be completed in 90 days. Concerning the RF Interface Control Document, ESA and NASA GSFC have reached agreement on its contents. The final review was completed January 16, and the document is now being prepared for CCB processing.
- d. Planning for the HTV/TDRSS compatibility testing continues. NASDA agrees with the HTV/TDRSS Compatibility Test Plan, and detailed monthly telecons are expected to begin in February. Both Category 1 and 2 testing will take place at GSFC, with Category 1 testing tentatively set for December 2002. (The timeframe for Category 2 testing is TBD.)
- e. A draft version of the Compatibility Test Plan is underway at GSFC and will be further coordinated and developed during monthly telecons. A signature copy should be completed by late summer, 2002. NASDA is developing the RF Interface Control Document and is in good shape from previous iterations. Additional analyses being worked at GSFC will be eventually be factored in. A completion schedule for the document is TBD.

### **XXIII. Action Items**

The following action items were assigned at the January 23-24, 2002, NSG meeting and related splinter meetings.

#### **ACTION ITEM: NSG-01-23-01**

**ASSIGNEE:** JoAnn Sidotti

**ACTION:** Ensure that WSC is using a training plan or matrix for vector management training. Obtain a copy of the matrix from B. Hudgins.

**RESPONSE:**

**STATUS:** New

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#### **ACTION ITEM: NSG-01-23-02**

**ASSIGNEE:** JoAnn Sidotti

**ACTION:** Ensure that John Hankinson sends Henry Allen a copy of the presentation on the MOSA hardware replacement.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-03**

**ASSIGNEE:** Bruce Schneck

**ACTION:** Assemble a group, including GSFC, NISN, SMMs, NOMs, MIL, and JSC GC, to work out schedule for IP Command testing and transition.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-04**

**ASSIGNEE:** NISN - Scott Douglas

**ACTION:** Provide T. Sobchak a formal response to IP Command diversity for MIL launch support and recommended architecture.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-05**

**ASSIGNEE:** MSFC – Eric Hendrickson

**ACTION:** Provide an update on the landing-plus-six-hours payload requirement relative to KSC, Edwards, or WSSH landing. (To be part of the NACAIT.)

**RESPONSE:** As discussed at NSG, there currently are NO landing plus six-hour payload requirements. If requirements do occur, the requirement will be discussed/worked at the NACAIT.

**STATUS:** CLOSED

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**ACTION ITEM: NSG-01-23-06**

**ASSIGNEE:** Major Randall Moore/21SOPS

**ACTION:** Determine whether NASA services for RTS support can be covered under OAS contracts supports to IUS flyout.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-07**

**ASSIGNEE:** Bob Marriott/G. Horlacher

**ACTION:** Validate the OAS TCS UHF A/G requirement with the AEFTP.

**RESPONSE:** Oakhanger (LION) UHF requirement has been removed from the program requirement document (PRD). JSC will not schedule Oakhanger (LION) UHF starting with STS-110 and subsequent flights.

**STATUS:** New

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**ACTION ITEM: NSG-01-23-08**

**ASSIGNEE:** B. Schneck/D.Malone/G.Ruck

**ACTION:** Coordinate a test plan with KSC CD&SC to determine if they are experiencing E-lead transitions when using E&M Keying.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-09**

**ASSIGNEE:** B. Schneck/D. Connelly

**ACTION:** Withdraw the SR for transition to JSC.

**RESPONSE:** Don Connelly was notified on February 17, 2002 to withdraw the SR

**STATUS:** Closed

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**ACTION ITEM: NSG-01-23-10**

**ASSIGNEE:** Fred Pifer/Ray Grossman

**ACTION:** Work with J. McKinney to get update on STS orbiter high definition TV operations.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-11**

**ASSIGNEE:** B. Schneck/G. Troendly

**ACTION:** Determine if Maspalomas (USN) can support data dump for X-38.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-13**

**ASSIGNEE:** M. Mascari/Bryan Gioannini

**ACTION:** Determine if it makes sense to replace the current WSC differential ECL with something more commercially viable.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-14**

**ASSIGNEE:** J.Sidotti/J. Smith/A. Culley

**ACTION:** Coordinate posting forecasts and SGLT TDRS schedules on the ND web site.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-15**

**ASSIGNEE:** B. Schneck

**ACTION:** Talk with H. Michelsen regarding open TDRS scheduling.

**RESPONSE:** Howard Michelsen advised that UPS Release 13 provided JSC the capability of using Open TDRSS scheduling.

**STATUS:** CLOSED

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**ACTION ITEM: NSG-01-23-16**

**ASSIGNEE:** T. Sobchak

**ACTION:** Coordinate a virtual SIC scheduling orientation session for FAO, ops planners, and pointing. (Note: Coordinate with Milt, Bob, and Wayne.)

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG-01-23-17**

**ASSIGNEE:** J. Sidotti/M. Duffey

**ACTION:** Coordinate a time to do Release 13/ANCC testing, prior to shipping the ANCC to WSC.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: NSG/HEDS-01-22-01**

**ASSIGNEE:** M. Mascari/M. Allen

**ACTION:** Concerning voice compression, follow-up with AT&T on reconfiguration problem that impacted HST 109 Sim voice on January 18, 2002. Determine why comm managers did not review the scheduling of the modification relative to the HST T1s.

**RESPONSE:** The Comm Manager did not anticipate a service impact based on prior experience. When the service interruption occurred, AT&T required several minutes longer than expected to perform the reconfiguration.

**DUE DATE:** 02/05/02

**STATUS:** CLOSED

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**ACTION ITEM: NSG/HEDS-01-22-02**

**ASSIGNEE:** B. Manning

**ACTION:** Write NSR to reopen IONET backbone study.

**RESPONSE:** NSR number 29565 reopens NSR 28107. The NSR has a Requested Start Date of 03/15/02 and was submitted 02/05/02.

**DUE DATE:** 02/05/02

**STATUS:** CLOSED

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**ACTION ITEM: NSG/HEDS-01-22-03**

**ASSIGNEE:** B. Manning, M. McCutchen

**ACTION:** Review prioritized list of circuit restorals provided to carrier and verify that the ISS Command between MSFC and JSC is identified as a priority circuit for restoral.

**RESPONSE:** T. Boggs is working this issue with M. Salop (AT&T).

**DUE DATE:** 02/05/02

**STATUS:** New

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**ACTION ITEM: NSG/HEDS-01-22-04**

**ASSIGNEE:** M. Mascari

**ACTION:** Determine if ISS Command backup is on the same bundle as the primary channel.

**RESPONSE:** T. Boggs is working this issue with M. Salop (AT&T).

**DUE DATE:** 2/12/02

**STATUS:** New

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**ACTION ITEM: NSG/HEDS-01-22-05**

**ASSIGNEE:** B. Schneck  
**ACTION:** Ensure that the mission-critical outage notification process is working.  
**RESPONSE:** There is a LOP stating that users/carriers, etc will be notified of outages. A reminder ODM, (a local memorandum) was issued to remind everyone in Nascom to coordinate outages with CD&SC.  
**DUE DATE:** 2/12/02  
**STATUS:** CLOSED

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**ACTION ITEM: NSG/HEDS-01-22-06**

**ASSIGNEE:** Dylan Mathis  
**ACTION:** Determine if there are drivers for the additional line from Bldg. 8 to Bldg. 17 that is requested for MPEG-2/MPEG-4 testing.  
**RESPONSE:** The following response was provided by Jeff Durham/Patrick Chimes on January 23, 2002: *The third (encoder backup 17F-5) line is lit up; it terminates on a patch panel in building 8, and on the drawing it looks like it goes to the NISN i/f cabinet (i.e., minimal work to exercise it).*  
**DUE DATE:** 02/05/02  
**STATUS:** CLOSED

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**ACTION ITEM: NSG/HEDS-01-22-07**

**ASSIGNEE:** B. Manning  
**ACTION:** Complete and document configuration required to provide ISS video to RPI sites that have peering relationship to same network that NISN currently has multicast relationship with.  
**RESPONSE:** Update 2/5: Video is going to Madison, WI.  
**DUE DATE:** 2/12/02  
**STATUS:** New

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**ACTION ITEM: NSG/HEDS-01-22-08**

**ASSIGNEE:** B. Manning  
**ACTION:** Confirm with R. Wegener the three-month implementation time (Option 1) for using existing channel banks at JSC.  
**RESPONSE:** Implementation time is three months after SR approval.  
**DUE DATE:** 02/05/02  
**STATUS:** CLOSED

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**ACTION ITEM: NSG/HEDS-01-22-09**

**ASSIGNEE:** B. Manning  
**ACTION:** Determine cost of providing ISS video at Glenn Research Center.  
**RESPONSE:** Update 2/5: Mr. Manning indicates charges for this will be \$119,000.  
**DUE DATE:** 02/05/02  
**STATUS:** New

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**ACTION ITEM: NSG/HEDS-01-22-10**

**ASSIGNEE:** B. Manning



**ACTION:** Ensure that M. McCutchen and M. Allen include IP/IONET in their efforts to standardize processes and terminology.  
**RESPONSE:** Update 2/5: B. Manning has spoken to M. McCutchen concerning this action.  
**DUE DATE:** 02/05/02  
**STATUS:** New

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**ACTION ITEM: NSG/ISS/SSP-01-23-01**

**ASSIGNEE:** J. Sidotti  
**ACTION:** Request that H. Toomer distribute to JSC contact information (including pager numbers) for ISS/SSP points of contact at GSFC.  
**RESPONSE:**  
**STATUS:** New

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**ACTION ITEM: NSG/ISS/SSP-01-23-02**

**ASSIGNEE:** B. Schneck  
**ACTION:** Arrange for a web site accessible to JSC for posting WSC Long Range schedule information as well as other pertinent Network items.  
**RESPONSE:**  
**STATUS:** New

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**ACTION ITEM: NSG/ISS/SSP-01-23-03**

**ASSIGNEE:** J. Sidotti  
**ACTION:** Provide Mike Duffey with a list of documents being evaluated for updates because of the DSMC transition.  
**RESPONSE:**  
**STATUS:** New

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**ACTION ITEM: WSSH-01-23-01**

**ASSIGNEE:** B. Schneck  
**ACTION:** Investigate impacts (staffing and cost) to support JSC dump requirements at MILA and WFF.  
**RESPONSE:**  
**STATUS:** New

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**ACTION ITEM: WSSH-01-23-02**

**ASSIGNEE:** B. Schneck/ W. Ihnat  
**ACTION:** Investigate upgrading DFRC comm lines to support 1-Mb dump rates. Consider using moved OAS circuits  
**RESPONSE:**  
**STATUS:** New

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**ACTION ITEM: WSSH-01-23-03**

**ASSIGNEE:** T. Sobchak  
**ACTION:** Work with DFRC management to determine staffing requirements to support JSC dumps requirements.

**RESPONSE:** Currently identified JSC on-orbit requirements pose no-impact to current DFRC staffing. In fact DFRC estimates they could support FM dumps for all passes that have scheduled DFRC c-Band support.

**STATUS:** CLOSED

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**ACTION ITEM: WSSH-01-23-04**

**ASSIGNEE:** T. Sobchak, B. Schneck

**ACTION:** Talk with USN (commercial sites) regarding off-range support for JSC dump requirements.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: WSSH-01-23-06**

**ASSIGNEE:** B. Schneck/M. Mascari

**ACTION:** Do we need increased bandwidth at DFRC and WLPS to support on-orbit FM dump requirements. Can existing OAS Circuits be moved to meet the requirements for DFRC and WLPS. Can we use OAS equipment and circuits to provide the WSMR data interface requirements.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: WSSH-01-23-07**

**ASSIGNEE:** S. Stich

**ACTION:** JSC will provide formal feedback regarding Oak Hangar support requirements.

**RESPONSE:** Oak Hangar UHF A/G requirements to be removed after STS-109 and subsequent flights.

**STATUS:** CLOSED

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**ACTION ITEM: WSSH-01-23-09**

**ASSIGNEE:** T. Sobchak

**ACTION:** Evaluate FM dump capability from existing WSSH S-band sites.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: WSSH-01-23-10**

**ASSIGNEE:** F. Pifer

**ACTION:** Coordinate scheduling of STA flybys at WSSH for UHF proficiency passes.

**RESPONSE:**

**STATUS:** New

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**ACTION ITEM: WSSH-01-23-11**

**ASSIGNEE:** J. Smith

**ACTION:** Provide WSSH presentations to Messrs. F. Smith and R. Thornton and Ms. M. McLamb.

**RESPONSE:** WSSH presentation sent to F. Smith, R. Thornton, and M. McLamb on or before February 5.  
**STATUS:** CLOSED

(Original Approved by:)  
Ted Sobchak  
GSFC/Network Director